

said peripheral circuit comprises a CMOS device comprising n-channel and p-channel TFTs, each of said n-channel and p-channel TFTs comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein each of the source and the drain regions has a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

79. (Amended) A device according to claim 78 wherein said [semiconductor device comprises] transistors are selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

80. (Amended) A device according to claim 78 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

81. (Amended) A device according to claim [80] 78 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

82. (Amended) A device according to claim 78 wherein [a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs] said semiconductor film comprises amorphous silicon.

83. (Amended) A device according to claim 78 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

84. (Amended) [A semiconductor device for electro-optical device comprising] An active matrix type display device having a plurality of pixels and a peripheral circuit, wherein said peripheral circuit comprises a CMOS device comprising n-channel and p-channel TFTs, each of said n-channel and p-channel TFTs comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein [each of the source and the drain regions] said channel region has at least a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

85. (Amended) A device according to claim 84 wherein said [semiconductor device comprises] transistors are selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

86. (Amended) A device according to claim 84 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

87. (Amended) A device according to claim [86] 84 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

88. (Amended) A device according to claim 84 wherein [a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs] said semiconductor film comprises amorphous silicon.

89. A device according to claim 84 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

90. (Amended) [A semiconductor device for electro-optical device comprising] An active matrix type display device having a plurality of pixels and a peripheral circuit, wherein said peripheral circuit comprises a CMOS device comprising n-channel and p-channel TFTs, each of said n-channel and p-channel TFTs comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein each of the source and the drain regions has a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

91. (Amended) A device according to claim 90 wherein said [semiconductor device comprises] transistors are selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

92. (Amended) A device according to claim 90 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

93. (Amended) A device according to claim [92] 90 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

94. (Amended) A device according to claim 90 wherein absolute value of a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs.

95. A device according to claim 90 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

96. (Amended) [A semiconductor device for electro-optical device comprising] An active matrix type display device having a plurality of pixels and a peripheral circuit, wherein said peripheral circuit comprises a CMOS device comprising n-channel and p-channel TFTs, each of said n-channel and p-channel TFTs comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein [each of the source and the drain regions] said channel region has at least a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

97. (Amended) A device according to claim 96 wherein said [semiconductor device comprises] transistors are selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

98. (Amended) A device according to claim 96 wherein said semiconductor [layer] film comprises [ non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

99. (Amended) A device according to claim [98] 96 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

100. (Amended) A device according to claim 96 wherein absolute value of a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs.

101. A device according to claim 96 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

102. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels and a peripheral circuit, wherein said peripheral circuit comprises a CMOS device comprising n-channel and p-channel TFTs, each of said n-channel and p-channel TFTs comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode [adjacent to] under said channel region with a gate insulating film interposed therebetween,

wherein [said channel region] each of the source and the drain regions has [at least two portions] a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more, [and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

103. (Amended) A device according to claim 102 wherein said semiconductor [layer] film [is included in both n-channel and p-channel TFTs in a CMOS device of said electro-optical device] comprises amorphous silicon.

104. (Amended) A device according to claim 102 further comprising:

a first interlayer insulating film over said semiconductor [layer] film and said gate electrode, said first interlayer insulating film comprising inorganic material; and  
a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin[; and  
a pixel electrode on said second interlayer insulating film],  
wherein said [electro-optical] active matrix type display device is a transparent type or a reflective type device.

105. (Amended) A device according to claim 102 wherein said [semiconductor device comprises transistors selected from the group consisting of one of a stagger type, an inverted stagger type, a planar type, and an inverted planar type transistors] channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

106. (Amended) A device according to claim 102 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

107. (Amended) A device according to claim [106] 102 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

108. (Amended) A device according to claim [103] 102 wherein absolute value of a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs.

109. (Amended) A device according to claim 102 wherein [each of said portions] said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

110. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels and a peripheral circuit, wherein said peripheral circuit comprises a CMOS device comprising n-channel and p-channel TFTs, each of said n-channel and p-channel TFTs comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein said channel region has at least two portions containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

111. (Amended) A device according to claim 110 wherein said [semiconductor layer is included in both n-channel and p-channel TFTs in a CMOS device of said electro-optical device] channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

112. (Amended) A device according to claim 110 further comprising:

a first interlayer insulating film over said semiconductor [layer] film and said gate electrode, said first interlayer insulating film comprising inorganic material; a



a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin[; and  
a pixel electrode on said second interlayer insulating film],  
wherein said [electro-optical] active matrix type display device is a transparent type or a reflective type device.

113. (Amended) A device according to claim 110 wherein said semiconductor [device comprises transistors selected from the group consisting of one of a stagger type, an inverted stagger type, a planar type, and an inverted planar type transistors] film comprises crystalline silicon.

114. (Amended) A device according to claim 110 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

115. (Amended) A device according to claim [114] 110 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises amorphous silicon.

116. (Amended) A device according to claim [111] 110 wherein absolute value of a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs.

117. A device according to claim 110 wherein each of said portions is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

118. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels, each pixel comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein [said channel region has at least two portions containing] each of the source and the drain regions has a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

119. (Amended) A device according to claim 118 wherein said [semiconductor layer is included in both n-channel and p-channel TFTs in a CMOS device of said electro-optical device] channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

120. (Amended) A device according to claim 118 further comprising:

a first interlayer insulating film over said semiconductor [layer] film and said gate electrode, said first interlayer insulating film comprising inorganic material;

a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin; and  
a pixel electrode on said second interlayer insulating film,  
wherein said [electro-optical] active matrix type display device is a transparent type or a reflective type device.

121. (Amended) A device according to claim 118 wherein said [semiconductor] active matrix type display device comprises transistors selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

122. (Amended) A device according to claim 118 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

123. (Amended) A device according to claim [122] 118 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

124. (Amended) A device according to claim [119] 118 wherein [a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs] said semiconductor film comprises amorphous silicon.

125. (Amended) A device according to claim 118 wherein [each of said portions] said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

126. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels, each pixel comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween; and

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween,

wherein said channel region has at least two portions containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

127. (Amended) A device according to claim 126 wherein said [semiconductor layer is included in both n-channel and p-channel TFTs in a CMOS device of said electro-optical device] channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

128. (Amended) A device according to claim 126 further comprising:

a first interlayer insulating film over said semiconductor [layer] film and said gate electrode, said first interlayer insulating film comprising inorganic material;

a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin; and

a pixel electrode on said second interlayer insulating film,  
wherein said [electro-optical] active matrix type display device is a transparent type or a reflective type device.

129. (Amended) A device according to claim 126 wherein said [semiconductor] device comprises transistors selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

130. (Amended) A device according to claim 126 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

131. (Amended) A device according to claim [130] 126 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

132. (Amended) A device according to claim [127] 126 wherein [a threshold voltage of said n-channel TFT is approximately equivalent to that of p-channel TFTs] said semiconductor film comprises amorphous silicon.

133. A device according to claim 126 wherein each of said portions is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

134. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels, each pixel comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween;

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween;

[a first interlayer insulating film over said semiconductor layer and said gate electrode, said first interlayer insulating film comprising inorganic material;

a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin;] and

a pixel electrode [on said second interlayer insulating] connected to said semiconductor film,

wherein each of the source and the drain regions has a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

135. (Amended) A device according to claim 134 wherein said [semiconductor] active matrix type display device comprises transistors selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

136. (Amended) A device according to claim 134 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

137. (Amended) A device according to claim [136] 134 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

138. (Amended) A device according to claim 134 wherein said gate electrode comprises one selected from the group consisting of a silicon film containing phosphorus, a multilayer film comprising silicon and molybdenum, [or] and a multilayer film comprising silicon and tungsten.

139. A device according to claim 134 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

140. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels, each pixel comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween;

a gate electrode adjacent to said channel region with a gate insulating film interposed therebetween;

[a first interlayer insulating film over said semiconductor layer and said gate electrode, said first interlayer insulating film comprising inorganic material;

a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin;] and

a pixel electrode [on said second interlayer insulating] connected to said semiconductor film,

wherein [each of the source and the drain regions] said channel region has a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

141. (Amended) A device according to claim 140 wherein said [semiconductor] active matrix type display device comprises transistors selected from the group consisting of [one of a] stagger type, [an] inverted stagger type, [a] planar type, and [an] inverted planar type transistors.

142. (Amended) A device according to claim 140 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

143. (Amended) A device according to claim [142] 140 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

144. (Amended) A device according to claim 140 wherein said gate electrode comprises one selected from the group consisting of a silicon film containing phosphorus, a multilayer film comprising silicon and molybdenum, [or] and a multilayer film comprising silicon and tungsten.



145. A device according to claim 140 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

146. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels, each pixel comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween;

a gate electrode [adjacent to] under said channel region with a gate insulating film interposed therebetween;

[a first interlayer insulating film over said semiconductor layer and said gate electrode, said first interlayer insulating film comprising inorganic material;

a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin;] and

a pixel electrode [on said second interlayer insulating] connected to said semiconductor film ,

wherein each of the source and the drain regions has a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

147. (Amended) A device according to claim 146 wherein said [semiconductor device comprises transistors selected from the group consisting of one of a stagger type, an inverted stagger type, a planar type, and an inverted planar type transistors] channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

148. (Amended) A device according to claim 146 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

149. (Amended) A device according to claim [148] 146 wherein said non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon.

150. (Amended) A device according to claim 146 wherein said gate electrode comprises one selected from the group consisting of a silicon film containing phosphorus, a multilayer film comprising silicon and molybdenum, [or] and a multilayer film comprising silicon and tungsten.

151. A device according to claim 146 wherein said portion is located adjacent to a boundary between the source and the channel regions or a boundary between the drain and the channel regions.

152. (Amended) [A semiconductor device for electro-optical device] An active matrix type display device having a plurality of pixels, each pixel comprising:

a semiconductor [layer] film comprising at least a channel region and source and drain regions with said channel region interposed therebetween;

a gate electrode [adjacent to] under said channel region with a gate insulating film interposed therebetween;

[a first interlayer insulating film over said semiconductor layer and said gate electrode, said first interlayer insulating film comprising inorganic material;

a second interlayer insulating film on said first interlayer insulating film, said second interlayer insulating film comprising organic resin;] and

a pixel electrode [on said second interlayer insulating] connected to said semiconductor film,

wherein [each of the source and the drain regions] said channel region has at least a portion containing one or more elements selected from the group consisting of carbon, nitrogen, and oxygen at a concentration of  $1 \times 10^{19}$  atoms/cm<sup>3</sup> or more[, and

wherein said channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>].

153. (Amended) A device according to claim 152 wherein [said semiconductor device comprises transistors selected from the group consisting of one of a stagger type, an inverted stagger type, a planar type, and an inverted planar type transistors] channel region contains boron at a concentration of from  $1 \times 10^{15}$  to  $5 \times 10^{17}$  atoms/cm<sup>3</sup>.

154. (Amended) A device according to claim 152 wherein said semiconductor [layer] film comprises [a non-single crystalline semiconductor layer comprising] one selected from the group consisting of silicon, germanium, and gallium arsenide.

155. (Amended) A device according to claim [154] 152 wherein said [non-single crystalline semiconductor comprises one selected from the group consisting of amorphous silicon, polycrystalline silicon, and semi-crystalline silicon] semiconductor film comprises crystalline silicon.

156. (Amended) A device according to claim 152 wherein said gate electrode comprises one selected from the group consisting of a silicon film containing phosphorus, a multilayer